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to 7, beryllium acetylacetonate is extracted with 20m*l* of chloroform. The organic layer is washed twice with 50m*l* of 0.1*N* NaOH solution, and absorbance is obtained at 295mμ, against the reagent blank. Natural water sample; To the slightly acidified water sample, ferric chloride solution is added as a carrier, and pH is adjusted to 8 with ammonia. Ferric hydroxide is filtered and dissolved with hydrochloric acid, and then beryllium is determined by the spectrophotometric procedure. When the sample contains silicates, the hydroxide is heated at low temperature, and then treated with hydrofluoric acid to remove any silica. Sea water, lake water samples and several biomaterials such as seaweed were analyzed by the procedure described.

Countercurrent distribution of iron and copper in acetylacetone - butyl acetone system. Tsunenobu Shigematsu and Masayuki Tabushi. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 374 (1962).

Coprecipitation of scandium with calcium oxalate. Tsunenobu Shigematsu, Masayuki Tabushi and Masakazu Matsui. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 381 (1962).

Dibenzoylmethane as a chelating reagent in solvent extraction and spectrophotometric determination. Tsunenobu Shigematsu, Masakazu Tabushi and Tsunehiko Tarumoto. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 388 (1962).

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Effects of addition of lithia containing glasses on the properties of lithia ceramics. Studies on the thermal shock resisting ceramics of the Li_2O-Al_2O_3-SiO_2 system. I. Megumi Tashiro and Toshio Maki. *Yogyo Kyokai Shi*, **70**, 8 (1962), in Japanese.—Powdered frits of lithia containing glasses were added as the binding agent in a total amount of 5~20% to finely divided natural petalite ($Li_2O \cdot Al_2O_3 \cdot 8SiO_2$). The compositions of glasses were 4 ~ 18 Li_2O, 4 ~ 21 Al_2O_3, 52~86 SiO_2 and 5 ~ 25% (wt) ($MgO + ZrO_2 + P_2O_5$). The mixtures were ball-milled to a finess smaller than 200 mesh, dry pressed under pressure of 900 kg/cm^2 with an addition of 0.05% PVA, formed into bars of 5×5×50mm, and fired at a temperature 1080° ~ 1320°C until the mixture sintered to an apparent porosity of about zero. The results showed that the addition of the glasses produces profound effects in (a) increasing the firing range or the interval between the sintering temperature and the sagging temperature, (b) increasing the modulus of rupture of the sintered bodies, and (c) improving their thermal shock resistance. Among the glasses tested the one having the composition, 10.7Li_2O, 8.9MgO, 8.9Al_2O_3, 71.5% (wt) SiO_2, showed the best results: The firing range was increased from -20°C for the body of 100% petalite ((−) means that the sagging temperature is lower than the sintering temperature and (+) the reversed case) to +40°C for the body containg 10 weight percent of the above glass. The strength of the sintered body was increased by 100%. The specimen of the above size withstood repeated quenchings from 1000°C into

cold water without showing cracking or spalling. In place of natural petalite, the other lithia containing minerals such as eucryptite ($Li_2O \cdot Al_2O_3 \cdot 2SiO_2$) and spodumen ($Li_2O \cdot Al_2O_3 \cdot 4SiO_2$) were used as the principal raw materials to be added with the lithia containing glass but without obtaining good results in regard to firing range and thermal shock resistance.

The process of the formation of silver colloid in the photosensitive glass by the use of a high-temperature spectrophotometer. Megumi Tashiro and Naohiro Soga. *Kogyo Kagaku Zasshi*, **65**, 337 (1962), in Japanese.—The glass of the composition, 15 K_2O, 10 BaO, 75 SiO_2, 0.1 AgCl, 0.03 CeO_2 (mole %), was exposed to U.V.- or Gamma-radiation, and then its spectral absorption curves were measured at temperatures ranging from room temperature to 550°C by means of a spectrophotometer with a high temperature cell attachment specially designed and fabricated for heating the glass specimens. For U.V. irradiated specimens, the following three bands have been found to develop successively during heating; the 235mμ band on U.V. exposure, the 275mμ band on heating from 220 to 300°C, and the 412mμ band over 350°C, of which the last one had already been reported in the literature and was considered to be due to the colloidal silver. For Gamma-irradiated specimens, in addition to the above three absorption bands, one more band at 360μ has been found to develop on exposure. The bands with maxima at 235, 275 and 360mμ have been considered to be due to, respectively, the atomic silver, the group of several silver atoms (the latent image of the colloidal silver), and the color center of a silver ion. The fluorescence and the thermoluminescence measurements have also been carried out with the same specimens to support the above conclusion.

The function of cerium as photosensitizer in the photosensitive glass. Megumi Tashiro and Naohiro Soga. *Kogyo Kagaku Zasshi*, **65**, 342 (1962), in Japanese.—In the transmission curve of silver-containing photosensitive glass, the four absorption peaks at 360, 235, 275 and 412mμ are observed which appear successively in the process from exposure to high energy ray to development of the image of silver colloid. The authors investigated the relation between the amount of cerium oxide introduced as the photosensitizer into the glass and the intensity of these absorption peaks. Thec omposition of the glasses used as the specimen was 15 K_2O, 10 BaO, 75 SiO_2, 0.1 AgCl, and 0~0.3 CeO_2 (mole %). The continuous spectrophotometric measurements from room temperature up to 550°C for these specimens were made with a hightemperature spectrophotometer. The results showed that with increasing the amount of cerium oxide the intensity of the absorption bands at 360 and 235mμ, which were due to silver color centers and silver atoms, respectively, decreased, whereas those at 275 and 412mμ, due to latent image (groups of several silver atoms) and real image of silver colloids, respectively, increased to maximum and then decreased. These results may be explained by assuming that Ce^{3+} ions inhibit the formation of silver color center, whereas Ce^{4+} ions, which are always present in equilibrium with Ce^{3+} ions in the glass, promote the formation of latent image of silver colloids.

Role of cerium ions in preventing the gamma-ray induced coloration of glass. Naohiro Soga and Megumi Tashiro. *Yogyo Kyokai Shi*, **70**, 143 (1962), Japanese.—

Glasses containing various amount of trivalent cerium ion ($20K_2O$, 10BaO, $70SiO_2$, $0.1CeO_2$, and $0 \sim 0.2$ Si (mole %)) were first exposed to γ-radiation until they were colored to the same degree, and then, the fading of their color occurred with the lapse of time was measured. The content of Ce^{3+} ion in these glasses was also measured by the spectrophotometric method in order to obtain a relation between its content in the glasses and the fading velocity of their γ-ray induced color. The result showed that the higher the content of Ce^{3+} ion in the glass is, the higher the fading velocity of its color is. On the basis of this result and the results of the spectrophotometric studies on the cerium-containing glasses so far made by the authors (*J. Ceram. Assoc. Japan*, **68**, 132; 169 (1960)), the authors gave their view on the role of Ce^{3+} ion in preventing the γ-ray induced coloration of glass: Being excited by γ-ray irradiation, oxygen ions in glass loose some of their electrons. The Ce^{3+} ions give their weak-bonded 4f-electrons to the oxygen ions, thus preventing the formation of V-center like defects in glass. At the same time, the Ce^{3+} ions, now holding positive holes as the result of their lending their 4f-electrons to the oxygens, catch the ionized electrons that would be trapped or were already trapped by oxygen ion vacancies, thus preventing the formation of F-center like defects in glass. The total function of the Ce^{3+} ion in glass under γ-ray irradiation is, therefore, the recombination of the positive holes and the ionized electrons, thus preventing the formation of color centers.

Some considerations on the non-similar changes of the void spaces produced by the thermal expansion of refractory bodies. Susumu Nagasaki, Akira Watanabe, Kazuhiro Yoshizaki and Kaoru Umeya. *Zairyo Shiken*, **11**, 510 (1962), in Japanese.

Studies on the thermal cracks of the refractory clay bodies produced in the low firing temperature range. Susumu Nagasaki, Akira Watanabe, Kazuhiro Yoshizaki and Kaoru Umeya. *Zairyo Shiken*, **11**, 567 (1962), in Japanese.—Some fractures or cracks of the refractory clay bodies generated in the low firing temperature range were observed, and the relation between the thermal cracks and the packing of the material powders were investigated. The results were: (1) the original packing characteristics were changed remarkably by the thermal expansion produced in the bodies during heating procedure, but the effects in the cooling period were not remarkable. (2) The fractures of the bodies produced in the heating period were also affected by the blending of the component powders. Cracks were generated by poor blending. (3) Poor blending, however, produced good packing of the material powders in the heating procedure. Coarse constituents produced also good packing of the powder in the heating period. (4) When Roseki powder were used as the coarse constituent and clay powder as the fine one, the resultant composition was quite proof against producing the non-similar changes of the void spaces.

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Viscoelastic properties of bentonite pastes. Hiroshi Aida, Tetsuya Hanai and Rempei Gotoh. *Nippon Kagaku Zasshi*, **83**, 536 (1962).—See, this Bulletin, **40**, 404 (1962).